

ROYAL BOTANIC GARDENS, KEW.

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VII.—THE FLORA OF MADRAS: III.

The third part (pp. 391–577) *Leguminosae-Caesalpinioideae* to *Caprifoliaceae* of the Flora of Madras has now been published, and the following notes have been drafted by Mr. Gamble. We are indebted to him for the opportunity of placing these on record for the information of workers in herbaria, relative to conclusions with regard to particular species dealt with in the work that differ from those arrived at by earlier writers.

NOTES ON THE FLORA OF MADRAS.*

J. S. GAMBLE.

Leguminosae-Papilionatae.—In the Key to the Genera at p. 276, line 2, after “1-seeded,” should be inserted “(except nos. 24 and 25).” The omission was made inadvertently, and I am obliged to the Reviewer of Part ii in the “Journal of Botany,” for July, 1918, p. 220, for drawing my attention to it. Both *Pycnospora* and *Pseudarthria* are clearly, as was pointed out in the “Genera Plantarum,” nearly related to *Desmodium*, in which genus, indeed, one species, *D. gyrans*, has also the character of the joints of the pod not separating. *Arachis* also has the pod not jointed, while *Lespedeza* has only one joint, but both seem rightly to belong to *Hedysareae*.

Indigofera. I am still a little in doubt about the correct name for the well-known common shrub of the forest undergrowth described as *I. pulchella*, Roxb. In adopting this name I have only followed other works, but I am inclined to think that there are perhaps two species—the northern one, *I. elliptica*, Roxb., the southern one, *I. cassioides*, Rotte, though I found it impossible to give satisfactory distinguishing characters.

Tephrosia. I am much indebted to Mr. J. R. Drummond for his assistance in this genus which he has been studying for so long. I hope that his general paper on the genus will soon be published, with the descriptions of his new species, *T. wynaadensis* and *T. Barberi*.

* Previous notes were published in the *Bulletin* for 1916, p. 57, and for 1918, p. 222.

Sesbania. I have not followed Dr. Merrill in taking the Linnean specific name and changing *S. aegyptiaca*, Pers. into *S. Sesban*; see Philipp. Journ. Sc.vii. 235. In my opinion, *S. Sesban* practically is a "duplicate binomial," and so I think it best to adhere to the well-known name of *S. aegyptiaca*.

Smithia. An omission under *S. geminiflora*, Roth, requires correction. Before "W. & A. 220," should be inserted "*S. sensitiva*, Ait."

Desmodium. True *D. Cephalotes*, Wall., occurs in the hills of the Northern Circars, specimens of it, collected in the hills of Ganjam, having recently been received at Kew. When I prepared the account for the Flora, I possessed leaf specimens from the hills of Vizagapatam which I believed to belong to it. They were, however, unfortunately without fruit, so that I could not be sufficiently sure about it. It must now be added to the Flora.

Erythrina. I have described in *Kew Bulletin*, 1919, p. 222, as a new species, *E. mysorensis*, from a specimen collected by Mr. Meebold at Chickenhalli, in Mysore. There is, however, I think it right to explain as I did in the *Kew Bulletin* referred to, a possible doubt as to its being really an indigenous Indian plant. It may have been collected in a garden, but I have gone carefully over all the specimens preserved at Kew and have not found any that agree with it, so that I think it was best to describe it as if it were certainly indigenous.

Pongamia. I received Dr. Merrill's "Interpretation of Rumphius' Herbarium Amboinense" too late for considering the question of adopting the name *P. pinnata* instead of *P. glabra* for the well-known Indian tree. Dr. Merrill considers that it is the *Cytisus pinnatus*, Linn., and that consequently the specific name *pinnata* has priority.

Derris. *D. eualata* was described in Beddome's *Icones* t. 186. but in my opinion, the description in the "Flora of British India" does not fit it at all well, while that of *D. platyptera*, Baker, agrees much better. The specimens written up at Kew as *D. eualata* are really *D. brevipes*, and those named *D. platyptera* correspond to Beddome's figure and description of *D. eualata*. It is strange that the important character of the diadelphous stamens shown in Beddome's figure is not mentioned in the "Flora of British India."

Leguminosae—Caesalpinioideae.—*Caesalpinia*. The reasons for abandoning the specific names, *Bonducella* and *Bonduc*, are given by Dr. Merrill in Philipp. Journ. Sc. Botany, v. 53, and Interp. Rumphius' Herb. Amboinense, 260. It seems to me that his arguments are sound, and I have consequently described the first two species as *C. crista*, Linn., and *C. Jayabo*, Maza. I think it is an advantage to get rid of the confusing names *Bonducella* and *Bonduc*.

Delonix. As Dr. Merrill has pointed out, the generic name *Poinciana* was established by Linnaeus for the plant now known as *Caesalpinia pulcherrima*, consequently *Poinciana*, Linn., cannot be maintained for *P. regia* and *P. elata*. It is unfortu-

nate that such a well-known name has to go, but it cannot be helped.

Leguminosae-Mimosoideae.—*Mimosa*. The discussion of the Indian species of *Mimosa*, and especially of those which have been considered to belong to *M. rubicaulis*, is the subject of a separate paper in the *Bulletin*. I am convinced that *M. rubicaulis*, Lamk., is a south Indian species only, and have described the Himalayan species as *Mimosa himalayana*. I have also described as a new species, *M. Barberi*, chiefly from Dr. Barber's specimens from Godavari. I first called it *M. angustisiliqua*, and as such it appears at p. 421 in two places. I then found that the name was inadmissible, so that it should be corrected to *M. Barberi*. The separate paper referred to contains the explanations regarding the species of *Mimosa* for the Western Peninsula of British India.

RHIZOPHORACEAE.—The nomenclature in the Tribe of *Rhizophoreae* is rather confusing, and has been much discussed, most lately by Merrill in his *Interpretation of Rumphius' Herbarium Amboinense*, published in 1917. He follows Trimen (*Journ. Linn. Soc.* xxiv, 142), in establishing the fact that Linnaeus' *Rhizophora conjugata*, represented in Hermann's Herbarium by a figure only, is really *Bruguiera gymnorrhiza*, Lamk. This necessitates altering the name *Rhizophora conjugata*, given by Henslow in the 'Flora of British India' to the second species of that genus, which now becomes *R. Candelaria*, DC.

It may be useful to record the identifications of the Mangroves figured in Rheede's 'Hortus Malabaricus,' figs, 31-37.

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| Fig. 31-32. 'Kandel' — <i>Bruguiera conjugata</i> , Merr. | |
| „ 33. 'Kari Kandel' — <i>Bruguiera cylindrica</i> , W. & A. | |
| „ 34. 'Pee Kandel' — <i>Rhizophora Candelaria</i> , DC | } <i>Rhizophoraceae</i> . |
| „ 35. 'Tsjeru Kandel' — <i>Kandelia Rheedii</i> , W. & A. | |
| „ 36. 'Pou Kandel' — <i>Aegiceras majus</i> , Gaertn. | |
| „ 37. 'Kada Kandel' — <i>Lumnitzera racemosa</i> , Willd. | <i>Myrsinaceae</i> . |
| | <i>Combretaceae</i> . |

COMBRETACEAE.—While travelling on Forest duty in various parts of South India I could not help being struck by the inadequacy of the arguments by which the well-marked species of *Terminalia*, *T. crenulata*, *T. tomentosa*, and *T. coriacea*, admitted by Wight and Arnott, were joined together into one species, *T. tomentosa*, in the 'Flora of British India.' I have, therefore, gone back to the arrangement of Wight and Arnott. *T. glabra*, W. & A., is not, I think, the same as *T. Arjuna*, but a separate North Indian species. Also, among the specimens which I had available for study, I found some which had the velvety fruits of *T. Bellerica*, though usually larger, but were different in leaf and inflorescence. On carefully comparing the description in Hooker's *Journal of Botany*, iii. 27, I came to the conclusion that

in all probability these specimens belonged to *T. Gella*, Dalz., but unfortunately I have failed to find any authentic specimens of the plant, and Beddome, in his 'Flora Sylvatica,' p. ciii, says he had never met with it. The only point in which Dalzell's description does not agree with the specimens I had before me was that of the glands on the petiole, which most, though not all, of the specimens possess, while Dalzell says they are absent. I have thought it best to assume that the specimens belong to *T. Gella* until the discovery of Dalzell's original specimens settles the question finally. *T. Gella* is not accounted for in Cooke's 'Flora of the Bombay Presidency.'

MYRTACEAE.—*Syzygium*. Since Part 3 was published, specimens from the collections of Colonel Beddome of the following two species of Ceylon plants gathered by him in the Anamalai Hills have been presented to Kew by the Madras Herbarium. The following are the necessary additions to the key and descriptions.

Flowers in short terminal cymes, the ultimate branchlets umbellate, 3-flowered; calyx-tube 0.75–1 in. long, glabrous, funnel-shaped, the mouth truncate with small rounded lobes; leaves oval-elliptic, obtuse at apex and base, 1.5–2 long, 1 in. broad, Crowded, the nerves at right angles to the mid-rib; petals pinkish 3.* *Fergusoni*.

3.* *Syzygium Fergusoni*, Gamble, n. comb. *Eugenia Fergusoni*, Trim. Fl. Ceyl. ii 172, t. 38.

W. Ghats, Anamalai Hills at 6000 ft. (Beddome).

A small or middle-sized tree with conspicuously long funnel-shaped calyx-tube.

Leaves chartaceous, oblanceolate-spathulate, obtuse or slightly acute at apex, much narrowed at base, up to 2 in. long, .75 in. broad, nerves distant; inflorescence-branches slender, the flowers very small, pinkish-white 9.* *olivifolium*.

9.* *Syzygium olivifolium*, Gamble, n. comb. *Eugenia olivifolia*, Duthie in F.B.I. ii 495.

W. Ghats, Anamalai Hills at 7000 ft. (Beddome).

A small much-branched tree with inconspicuous flowers.

MELASTOMACEAE.—*Osbeckia*. There is, and always has been, some difficulty about *O. aspera*, Blume, which is *Melastoma asperum* Linn. I have only found one Indian specimen at Kew, and that is in the Wallich Collection, no. 4073 A. Hb. Madr., collected at Courtallum by Mr. D. Mitchel, though there is also another small piece without name or locality, very likely another specimen of the same collecting. The rest of Wallich's no. 4073 is, in my opinion, A₂ and B *O. minor*, Triana, from Travancore, A₃ *O. glauca*, Benth., from Trincomali, Ceylon. I do not agree with C. B. Clarke in thinking that *O. minor*, *O. aspera*, *O. Kleinii* and

O. glauca can only differ by very minute characters, they seem to be quite easily distinguished from each other and from the three new species which I have thought it right to describe out of the rather heterogeneous sheets included in the Kew cover of *O. aspera*, viz.: *O. lineolata*, *O. courtallensis* and *O. Lawsoni*. They have been published in the *Kew Bulletin*.

I am not sure that *Osbeckia rostrata*, D. Don, var. *pulchella*, Triana, of which there is a specimen in the Kew Herbarium, should not be considered as a separate species. Beddome sent it to Kew with a description as *O. recalva*, but C. B. Clarke considered it to be the same as var. *pulchella*, though it seems to me different from the specimens of that variety from Bengal, Wall. Cat. 4059 and 4063, which do not quite answer to Clarke's description.

Osbeckia cupularis, Don, seems to be as often 5-merous as 4-merous, and this has to be remembered by field botanists who may be puzzled by the explanatory notes of Clarke's in the 'Flora of British India.'

Osbeckia sublaevis, Cogn. Of this species I have seen no authentic specimens, so that my identification of those which I have assumed to belong to it had to be done entirely by the description. I believe that my identification is correct. As I collected it myself on the rocks near the road leading to Sispara in the Nilgiris, I remember it as a small, almost fleshy, under-shrub with very bright large flowers.

Since Part 3 was published, specimens of the following two Ceylon mountain species have been sent to Kew by the Madras Herbarium from the Travancore-Tinnevely mountains. The following are the necessary additions to the key and descriptions:—

Tufts of bristles mostly stalked, some, on the lower part especially, sessile, appendages long-stalked, calyx-lobes triangular-lanceolate, pectinate on the margins.

Calyx-lobe with one large tuft of bristles at apex, simple bristles on the mid-rib at back, the bristles straight; leaves elliptic-oval, obtuse or obtusely acute at apex, subcordate at base, scabrous-hairy, up to 3 in. by 1.5 in., 5-ribbed. 7.* *rubicunda*.

Calyx-lobes with many bulbous bristles towards apex and on midrib at back, the bristles long and curved; leaves orbicular-ovate, cordate at base, ferruginous-villous, the margins recurved, .5 in. in diameter, strongly 5-7-nerved, the nerves impressed 7.** *buxifolia*.

7.* *Osbeckia rubicunda*, Arn.; F.B.I. ii 520.

W. Ghats, on Agastiamalai peak, Travancore-Tinnevely boundary, about 6000 ft. (*Barber*).

A shrub with large purple-red flowers in terminal clusters.

7. ***Osbeckia buxifolia*, Arn.; F.B.I. ii 518.**

W. Ghats, on Agastiamalai peak, Travancore-Tinnevely boundary, about 6000 ft. (*Barber*).

A much branched densely woolly shrub with large purple-red flowers among the upper leaves.

Memecylon. This very difficult genus has given trouble to most of those who have worked at it. This has been explained as regards the Ceylon species, in a note at the beginning of the genus in Trimen's 'Flora of Ceylon,' and, in the 'Flora of British India' Mr. C. B. Clarke found himself reduced to beginning with those species which seemed most distinct and grouping the "enormous mass of specimens that appear difficult to separate" under one, *M. edule*, Roxb. It is unfortunate that the "mass of specimens" available contains so many in a somewhat fragmentary condition, which makes it difficult to correlate flowering and fruiting ones, while the fact that in so many species the nervation of the leaves is difficult to distinguish increases the difficulty. In J. Burmann's 'Thesaurus' two species are figured, which were afterwards mentioned by his son, N. Burmann, in his 'Flora Indica,' as *M. capitellatum* and *M. umbellatum*. The former, the original type of the genus, described by Linnaeus in the 'Species Plantarum' in 1753, is, as stated by Trimen, "our best-marked species," and seems to be an endemic Ceylon plant. It is admirably figured in Trimen's Plate 41, and I have seen no Indian specimen that can be referred to it. The latter, also described from a Ceylon plant, according to Trimen from the figure given by Burmann, has been, I consider rightly, identified by Trimen with *M. ramiflorum*, Lamk., which occurs in the Southern District of Madras as frequently as it does in the low country of Ceylon. It is fortunate for me that during some eight years spent in the Madras Presidency, I was much attracted by these beautiful shrubs whose geographical distribution I think I understand fairly well, and I am convinced that this species is the one with small rather yellowish leaves and dry yellowish berries, so common in Carnatic districts from the Kistna river southwards to opposite Ceylon. In Wight's 'Illustrations' and in Wight & Arnott's 'Prodromus' it is clearly, in my opinion, meant by both their *ramiflorum*, Lamk., and *tinctorium*, Koen., and this seems to have been the view taken by Triana.

Now comes the question of Roxburgh's *M. edule*, Cor. Pl. t. 82. Roxburgh's own specimen is in the Wallich collection at Kew, No. 4107 A, and in his own descriptions in the 'Coromandel Plants' and 'Flora Indica,' he says it is "a very common small tree or large shrub to be found in every jungle all over the (Coromandel) coast." This is also mentioned in Rees' 'Cyclopædia.' He describes it as having smooth shining oval leaves and bluish-black pulpy edible berries. This agrees well with the plant which I know and have collected in Circar Districts from Orissa southwards to the Cuddapah and N. Arcot Ghât slopes, but not further south. Roxburgh's specimen has the leaves more acute at the base and more acuminate at the apex than his figure shows or as do my specimens, and he gives their size as '3-4 in. long by 2-3

in. broad,' which is larger than any specimen shows or than his figure depicts. I think that the measurements are, at any rate, extreme. In any case, I feel sure, for my own part, that Roxburgh's *M. edule* is the common species of the North Coromandel coast and adjacent hills, which undoubtedly has shining leaves and blue-black pulpy fruit. I cannot identify with it any other of the species described by other authors, unless perhaps it is the *M. ovatum*, Sm. in Rees Cyclop. in part, as recognised by Triana. Most of the specimens in the Kew Herbarium written up by C. B. Clarke as *M. edule* var. *ovata* seem to me to belong rightly to *M. grande*, Retz, as was recognised by Trimen. Of the Madras plants, therefore, placed by Clarke under *M. edule*, I propose to accept three species, *M. edule*, Roxb., *M. umbellatum*, Burm. f., and *M. grande*, Retz (*M. edule* var. *ovata*, Clarke) as well as *M. molestum*, a little known plant of the Anamalai hills with quadrangular branchlets. Clarke's var. *Rottleriana*, distinguished by larger flowers and longer peduncles, does not seem capable of separation as a species, or even as a variety, from *M. umbellatum*. It was collected by Heyne and seems to be the same as Wall. Cat. 4107 B.

The genus *Memecylon* is one which presents considerable difficulty, especially when one is dealing with dried specimens, many of those available being rather imperfect and "scrappy." It is a pity that I had not the Madras Herbarium specimens available, but when travelling about the Madras Presidency on Forest Department work in the years 1882-1890 the genus interested me and I collected many specimens myself. It may be not out of place here to put on record my idea of the geographical distribution of the chief species, because they seem to me to occupy fairly well defined regions. In the "dry evergreen" forests of the East Coast from Orissa down to the latitude of Madras the common and almost only species is *M. edule*, Roxb. In the more southern forests, overlapping *M. edule*, *M. umbellatum* is found from near the Kistna river southwards to Cape Comorin and westwards to the slopes of the Ghâts. It passes over into Ceylon which *M. edule* does not, and in Ceylon is found, apparently quite endemic, the pretty and well-marked *M. capitellatum*, so well figured by Burmann and in Trimen's Flora. On the West Coast the chief species is *M. grande*, not unlike, but distinct from *M. edule*, as well as other but less abundant species like *M. depressum*, *M. Talbotianum*, *M. deccanense*, *M. terminale*, *M. gracile*, and in the extreme south *M. angustifolium*. We now come to the hill species: the first to appear, in the Deccan hills of Cuddapah, extending to Coimbatore and the Nilgiris, is the slender *M. Lushingtonii*. In the Shola forests of the Nilgiris and Pulneys the most common species is *M. malabaricum*, very noticeable about Coonoor and other places for its bright flowers. We also get the yellow-leaved *M. flavescens* on the east and *M. molestum* on the west, while towards Sispara and Naduvatam the handsome *M. sisparsense* is conspicuous. Away to the north, on the Bengal-Central Provinces border, a little known species occurs at high levels which I have called *M. madgolense*. It is to be hoped that Madras botanists and forest officers will continue to pay attention to the genus and collect specimens both in flower and fruit, and obtain further

information about the distribution of the species. I am fully conscious of the imperfection of my account in the 'Madras Flora,' and I may very likely have made too many species, but I have tried to study and do my best with the material available.

LYTHRACEAE.—In this family I have adhered as nearly as possible to the arrangement adopted in Koehne's Monograph (Engler's Pflanzenreich), more especially as regards the subdivision of *Ammannia* (Genera Plantarum), into the three genera—*Rotala*, *Ammannia* and *Nesaea*. The only difficulty I have found is in *Rotala*, in which genus it is not at all easy to separate the species *R. leptopetala*, Koehne, and *R. densiflora*, Koehne. This has been fully pointed out by Blatter and Hallberg in a paper in the 'Journal of the Bombay Natural History Society, xxv 701,' in which they finally settle to combine the two species in one, *R. pentandra*, Blatt. and Hallb. I should, however, think that if their view is adopted, the oldest name would be *R. densiflora*. So far as the Madras material is concerned, I have succeeded, with the help of the lists of numbers given by Koehne, in separating the species fairly clearly, and I propose to adhere to the separation. The same authors also propose to put *R. macrandra*, Koehne, under *R. rotundifolia*, as in genera of *Lythraceae* the length of the stamens cannot be considered a safe character of division. There is much to be said for their point of view; all the same I prefer to leave the species as arranged by Koehne. The *macrandra* specimens are quite easy to recognize.

Lagerstroemia. For the reasons given by Sir G. King in his 'Malay Materials' and Dr. T. Cooke in his 'Flora of Bombay,' I have adhered to the well-known name *L. Flos-Reginae* for the splendid flowering tree so much grown in India, instead of *L. speciosa*, Pers. The two species, *L. Thomsonii*, Koehne, and *L. Rottleri*, C. B. Clarke, are apparently very little known and deserve to be carefully looked for by local botanists and forest officers in Madras.

SAMYDACEAE.—I regret that, by an oversight, the genera *Casearia* and *Homalium* were not described, as I think they should have been, under *Flacourtiaceae* in Part I. In that Part, the 'Flora of British India' was followed and the *Flacourtiaceae* joined to *Bixaceae* in which only *Bixa* should have been described, *Cochlospermum* being quite distinct, in a family of its own, *Cochlospermaceae*.

Casearia. I cannot agree with Sir D. Brandis ('Indian Trees,' p. 343) in combining *C. glomerata*, Roxb., and *C. graveolens*, Dalz. The latter is a very widespread small tree of low levels in Northern India, deciduous and with its leaves turning red before they fall, and is, I think, very distinct from the tall, apparently evergreen, *C. glomerata* of the Sikkim forests, about 7000 ft. I have been much puzzled to identify the species figured by Beddome (Flora Sylvatica, t. 208) as *C. varians*, Thw., and coming from the "dense moist forests of the W. Ghats at 2000–3000 ft. elevation." The figure does not agree with *C. esculenta*, Roxb., as Clarke and Bourdillon have identified it, nor entirely, though nearer, with *C. rubescens*, Dalz. There are two specimens in the Kew Herbarium, collected by Bourdillon—(1) No. 181 from ever-

green forests at Peermerd, 3500 ft., which, I think, is a form of *C. rubescens* with more lanceolate leaves than the Bombay plant; and (2) No. 104 from evergreen forests near Colatoorpolay, which is, I believe, the plant of Beddome's figure. I have, therefore, assumed it to be so, and, pending the possibility of examining more and better specimens, I am calling it *C. varians*, Bedd. *not* of Thw.

In his account of *C. varians*, Beddome also mentions as very common on the higher ranges of the Anamalais at 6000–7000 ft. and in Ceylon a tree with coriaceous leaves drying black. He identifies it with *C. coriacea*, Thw., which Trimen says is only a Ceylon species. I have seen no specimens from the Anamalais, but I believe it to be the tree of which I myself collected specimens at 7000 ft. on the Nilgiris, and which Sir A. and Lady Bourne collected at Gundattu Shola on the Pulneys. Fyson mentions this (Bourne 937), but says it was probably planted. Except that the leaves are rather larger, the specimens agree with Thwaites's from Ceylon.

VIII.—BOTANICAL EXPLORATION IN CHILE AND ARGENTINA.*

W. B. TURRILL.

Argentina was first visited by Europeans in the year 1516, when a company of Spanish adventurers under the leadership of Juan Diaz de Solis landed near the Rio de la Plata in search of a passage to the East Indies. In 1520 the Spanish King, Charles I. (better known as the Emperor Charles V.), sent Ferdinand Magellan (Fernando de Magellanes), a Portuguese, on an expedition round the world and in October, 1520, he discovered the straits now named after him. Chile was added to the Spanish dominions, by conquest and exploration from Peru as a centre, in 1540. Among the first explorers of these regions are included J. le Maire, W. C. Schouten, J. Hermite, Diego de Almagro and Pedro de Valdivia.

Some of the early authors refer more or less casually to plants and vegetable products, e.g., Azara, Najera, Orvalle and Rosales. **Louis Feuillée** (1660–1732), undertook a journey in South America between the years 1709 and 1711, and with him the botanical exploration of our area may be said to have commenced. He made observations and conducted researches at Buenos Aires, Montevideo, Concepcion and Valparaiso, and his results were published in three volumes with 50 plates (Journ. des observ. phys. math. et bot. Paris 1714). The work is largely a herbal and the nomenclature pre-Linnean. **Frezier** in 1712 to 1714 visited Valparaiso (where he lived 8 months), Santiago and Coquimbo. He is perhaps best known as the author who was indirectly responsible for the transfer of the name *Pomme de Terre* from *Helianthus tuberosus* to *Solanum*

* This essay was written privately for Mr. G. W. E. Loder, and it is published here with his kind permission.

tuberosus. He explored the central provinces and was the first to introduce *Fragaria chilensis* to Europe. His work, "Relation du Voyage de la Mer du Sud aux côtes du Chily et du Perou," was published in 1716-1717, and an English translation appeared in 1717. **Jorje Juan** and **Antonio de Ulloa** (1744) during their travels investigated certain indigenous and economic plants of Chile, and facts of botanical interest will be found in their works, of which the "Relacion historica del viage à la America meridional" (Madrid, 1748) has been translated into English under the title "A Voyage to South America," and has been passed through four editions in this language. **Olivares** also noted many of the natural products of the country. The French botanist **Philibert Commerson**, who accompanied Bougainville's Expedition (1767-1768) as surgeon and naturalist, brought back from the areas around the Magellan Straits an important collection of plants which became the basis of our knowledge of the Magellanic flora. His collection is in the Herbarium of the Muséum d'Histoire Naturelle, Paris. See Life of Philibert Commerson by Pasfield Oliver, pp. 93 seq., 226. The collections of **Banks** and **Solander** (Cook's First Voyage, Everyman ed., p. 14 seq.) added largely to the number of plants known from these regions and are chiefly at the British Museum. **Forster** and **Sparman** (Cook's Second Voyage, l.c. p. 203), 1772-1775, investigated especially the forest vegetation on the south-west of the Fuegian Archipelago.

In 1777 **H. Ruiz** and **J. Pavon** were authorised by the Spanish Government and King (Charles III.) to conduct natural history research in Peru and Chile in connection with **J. Dombey** a French doctor and botanist. After collecting in Peru they extended their researches to Chile traversing the territories of Concepcion, Itata, Rere, and Arauco, the provinces of Puchacay, Maule, San Fernando, Rancagua, Santiago and Quillota and part of the Andes. They returned to Lima with numerous specimens, notes and drawings. Many of these were lost through the wreck of the ship "le San-Pedro d'Alcantara" off Portugal in February, 1786, except Dombey's collections (including many duplicates of Ruiz and Pavon), which reached Europe safely and are at Paris (Herb. Mus d'Hist. Nat.) etc. See Ruiz & Pavon, Prod. de la fl. Per. et Chil. (1794), and Flora Per. Chil. (1798-1802). Their later explorations relate to Peru only.

A. Menzies was surgeon and naturalist to Vancouver, 1790-1795, and observed the flora and collected plants in Chile etc. His collections are at the British Museum and Kew. He introduced *Araucaria imbricata* into cultivation in Europe in 1796. **T. Haenke** also explored parts of Chile, but his work is of secondary importance. See Presl, Reliquiae Haenkeanae, Prague, 1830. Several Chilean Jesuits (**Molina**, **Gomez de Vidaurre**, etc.) wrote accounts of Chile containing information concerning the vegetation. The **Abbe Don J. Ignatius Molina** (1740-1829) was a native of Chile. His original work on this country was written in Italian, the author having fled to Bologna when the order of the Jesuits was suppressed in the Spanish possessions. The first part containing the natural history was published in

1787, the second part containing the civil history not till some years after. An English edition, entitled "The Geographical, Natural and Civil History of Chile" was published in 1809. An entire chapter of 36 pages is devoted to "Herbs, shrubs and trees," chiefly plants of economic value being described and named. There is also a systematic list "of the various species of natural productions" which includes the plants described in the body of the work. The German **Adalbert von Chamisso** collected (1816) around Concepcion.

J. Miers resided several years in La Plata and Chile. He landed at Buenos Aires in March, 1819, and traversed the country to Mendoza through Luxan, Salto and the provinces of Santa Fé, Cordoba (Cordova), and San Luis. From Mendoza he crossed the Paramillo range and the Uspallata desert and arrived at the valley of Tupungato. He then journeyed to Santiago and on to Valparaiso. Most of his numerous drawings, descriptions and notes have never been published. His herbarium of 20,000 sheets and MSS. are mostly at the British Museum. He published his "Travels in South America" in 1825, and monographs of various orders largely dealing with South American plants.

H. Cuming in 1819 made a voyage to South America and settled at Valparaiso. His most important work was connected with conchology, but he collected many botanical specimens, especially in Chiloe, the province of Maule, and in the neighbourhood of Concepcion, of Valparaiso and of Coquimbo. **Alexander Caldcleugh** aided Cuming, and his collections included plants from Santiago and Coquimbo. He also crossed the Pampas from Buenos Aires to Mendoza. **Capt. Beechy** visited Concepcion in 1825 and Valparaiso in 1825 and 1828, and also Coquimbo. His plants were described by W. J. Hooker and G. A. W. Arnott, "Botany of Capt. Beechy's Voyage," 1841. Hooker and Arnott had previously published in *Botanical Miscellany*, vol. iii., 1833, p. 129, under the title "Contributions towards a flora of South America and the Islands of the Pacific," an account of plants collected by numerous workers: Bertero, Bridges, Cruckshanks, Cuming, Miers, Gillies, Macrae, Darwin, etc.

T. Bridges was a Kew Collector in Chile, Peru, Bolivia, and California, 1827-1865. He collected plants in the neighbourhood of Valparaiso and Valdivia and up to Lake Runco in the Andes during an expedition against Indians. Another journey took him up into the Andes via the Plainchon Pass, while other plants received from him came from the province of Colchagua. He left Valparaiso for the north of Chile and explored the districts of Copiapo, Balenar and Trierina and crossed on foot the deserts between Copiapo and Huasco. He then returned along the coast to Coquimbo, some days afterwards taking the route to Valparaiso, passing by Andacolla and Petorca and descending the valley of Aconcagua he went by Quillota (Quitota).

Officers of **Capt. King's** expeditions (1826-1836) brought back plants from Chile, Fuegia, etc. These are at Kew, the British Museum, and Edinburgh. See "Narrative of the Voyages of

H.M.S. Adventure and Beagle." **Charles Darwin**, under Capt. Fitzroy of the "Beagle," visited Argentina, Chile and Patagonia. In Chile the Magellan Straits, the Chonos Archipelago, Chiloe, Mocha, Concepcion, and Valparaiso were visited and the Cordilleras were crossed south of Santiago. In north Chile Coquimbo, Huasco, Copiapo and Iquique were visited. Darwin was the first to investigate the flora of the eastern part of Fuegia and his plants are at Kew. See "Voyage of the 'Beagle'," 1844, and "Geological Observations on South America," 1846.

Eduard Poeppig was professor of zoology at Leipzig. In March, 1827, he landed at Valparaiso, and from then till October he explored the regions round Valparaiso, Santiago and Quillota. The mountains of Chacabuco and the valley of San-Felipe were explored and the Andes crossed to Mendoza, from whence he returned and embarked for Talcahuano (prov. Concepcion). The summer was spent in the Andes round Antuco and in March he returned to Talcahuano. Further explorations were conducted in Peru and Brazil. His plants are at Petrograd, Geneva, Kiel, Leipzig, Vienna, etc. See Poeppig and Endlicher, "Nov. Gen. et Sp. Chil. Per." 1827-1832.

C. J. Bertero made a rich collection of plants in Chile. Over 5000 specimens, perfectly preserved and accompanied by descriptions and notes, are at Paris. He was a native of Turin, and landed at Santiago in December, 1827. After travelling through the province of Aconcagua and a great part of North Chile, he passed the winter at Quillota and returned to Valparaiso in November, 1829. He visited Juan Fernandez, and afterwards Tahiti, and was lost at sea. See Colla, "Pl. rar. in reg. Chil. a Bert. nuper detectae" and Moris in Mem. Ac. reale delle sc. di Torino, vol. 37-39.

Claude Gay reached Valparaiso in December, 1828, and commenced research near Santiago. In 1830 he conducted systematic investigations in the neighbourhood of Rancagua, San Fernando, the Cordilleras of Cauquenes and Talcahue climbing the volcano Tunguraita. Then he traversed the coastline of the province of Colchagua and in the winter of 1831 he was in Copiapo and Coquimbo. He visited Juan Fernandez and returned to Chile in 1834 when he traversed the districts of Melipilla, Casa Blanca, and a part of the province of Aconcagua, and in October, 1834, he went to Valdivia, and later to Chiloe. After his return to Santiago he commenced research in September, 1836, in the province of Coquimbo, the Cordilleras of Santiago and the provinces of Maule and Concepcion. His plants are chiefly at Paris and his great work, "Historia fisica y politica de Chile" is composed of 26 volumes (8 zoology, 8 botany, 6 history, 2 documents, 2 agriculture), and an atlas.

A. Cruckshanks (about 1830) made excursions from Buenos Aires and Mendoza. **J. Gillies** resided (about 1830) several years at Mendoza and made excursions across the Cordilleras up to the Pacific and later across the Pampas to the Atlantic. He explored the heights of Uspallata and the mountains of the provinces of San Luis and Cordoba (Cordova). His plants are at Kew and the British Museum. **J. Baird** collected, in 1829

and 1830, some plants around Buenos Aires (and also in Uruguay).

Arsene Isabelle in February, 1830, reached the Rio de la Plata and landed at Montevideo, from whence he crossed in a few days to Buenos Aires. He visited Porto-Allegro (Brazil) and Uruguay, and apparently did little collecting in the Argentine. **F. J. F. Meyen** during the voyage of the "Prinzess Louise" (1830-1832) visited South America and botanically explored the neighbourhood of Valparaiso and Santiago. He climbed the high Cordilleras of Maypu and San Fernando, and also visited Coquimbo, Huasco and Arica. His book, "Reise um die Erde," was published in two volumes in 1834 and 1835. **B. Hombron** on the expedition of "l'Astrolabe" (1837-1840), under Dumont d'Urville, visited Concepcion and the Magellan Straits. His collections are at Paris and Geneva, and are especially rich in *Compositae*. The U.S. Expedition under **Capt. C. Wilkes** (1838-1842) made excursions in the neighbourhood of Valparaiso and Santiago, and a short one to the High Cordillera. See **Asa Gray**, "Botany of the United States Exploring Expedition." **J. Tweedie** collected on the banks of the Rio Plata and in Uruguay, and also south of Buenos Aires, from the Rio Salado up to the Serra de Tendil. His plants were sent to Kew between 1832 and 1849.

Bacle and his widow sent from time to time various plants from Buenos Aires and from the Andes of Argentina to Paris. **Comte Francis de Castelnau** (1843-1847) was in north Chile (and also in Colombia, Ecuador, Bolivia and Peru). The results of his collecting were published by Weddell, in "Chloris andina. Essai d'une Flore de la région alpine des Cordillères de l'Amér. du Sud," Paris, 1855-1857.

The investigations of **J. D. Hooker**, as published in his "Flora Antarctica," are very important. Hooker himself visited Hermite Island in the southern part of our region, and his "Flora Antarctica" includes plants collected by Banks, Darwin, Forster, Gaudichaud, King and others. It was believed by Hooker "that successive expeditions have nearly exhausted the phanerogamic productions" of the Magellanic area ("Flora Antarctica," II. introd.). Some 100 species of flowering plants which were not known in 1844 have, however, been discovered there since.

W. Lechler collected plants in the Magellanic area and in Chile. See his "Berb. Amer. austr. Accedit enumeratio plantarum quas in america australi auctor detexit," Stuttgart, 1857.

William Lobb was a collector for Veitch between 1840 and 1857. He first visited Brazil, but soon left for Chile, crossing the great Pampas of Argentina and the Chilean Andes. Continuing his journey southwards Lobb penetrated the great *Araucaria* forests, where he collected a large quantity of seeds of *Araucaria imbricata*, and was thus instrumental in bringing this conifer into general use for ornamental planting. He returned to England in 1844, but the following year went again to Brazil and thence to Valparaiso for the purpose of exploring south Chile. He obtained a rich harvest. Amongst his earliest successful introductions from this region were *Lapageria rosea*, *Escallonia*

macrantha, *Embothrium coccineum*, *Philesia buxifolia*, and *Desfontainea spinosa*. He continued explorations in Valdivia, Chiloe, and northern Patagonia, where he collected seeds and plants of *Libocedrus tetragona*, *Fitzroya patagonica*, *Sawegothea conspicua*, and *Podocarpus nubigena*. *Berberis Darwinii* was first introduced to British gardens during this interesting expedition. See "Hortus Veitchianus," p. 37. **Richard Pearce** also collected for Veitch between 1859 and 1866. He was instructed to proceed to Valparaiso and collect in Chile and Patagonia. His particular attention was directed to the collection of seeds of *Libocedrus tetragona*, at that time supposed to be the tree which produced the famous Alerce timber; *Lapageria rosea* and *L. alba*; the Chilean Pine (*Araucaria imbricata*), and other hardy trees and shrubs; secondly, to procure such plants as require a greenhouse temperature; and, thirdly, *Orchidaceae* and stove and greenhouse flowering plants. Pearce carried out these instructions and, besides the above-named plants, obtained and introduced *Prumnopitys elegans*, *Podocarpus nubigena*, *Eucryphia pinnatifolia*, several species of *Bomarea*, *Thibaudia acuminata*, *Ourisia coccinea*, *O. Pearcei*, and quantities of ferns. At the same time, through his researches, the true Alerce-producing tree was found to be *Fitzroya patagonica* and not *Libocedrus tetragona* as generally supposed. During 1860 Pearce made many journeys to the Cordilleras and the interior of the country, to Los Banos, the Baths of Chillan, and to Los Luganos, etc. His herbarium specimens are at Kew. See "Hortus Veitchianus," p. 45.

R. A. Philippi went to Chile in 1851, and in 1853 became professor of zoology and botany and Director of the National Museum. He was settled in Valdivia, and, naturally, studied the vegetation here very fully. He also made excursions from Santiago to the Cordilleras, to the baths of Colina, the Cordilleras of Rancagua and the district between the capital and Valparaiso, the volcano of Chillan, the provinces of Concepcion and Araucania. His very numerous publications appeared in many scientific periodicals.

R. O. Cunningham, during the voyage of H.M.S. "Nassau" (1866-1869), visited the Straits of Magellan and the west coast of Patagonia. See his "Notes on the Natural History of Straits of Magellan." This work also contains notes on Chiloe, Lota, Valparaiso, and Santiago.

P. G. Lorentz in 1871-1872 explored the provinces of Cordoba, Santiago del Estero, Tucuman and Catamarca, between 26° and 31° S. lat. The plants he collected were worked out and published by Grisebach in "Plantae Lorentzianae," 1874 (927 Argentine species). Lorentz himself published "Vegetacion del Nordeste de la Provincia de Entre Rios." In 1879 **Lorentz** and **G. Niederlein** accompanied General Rosa on an expedition to the Rio Negro. The plants collected on this expedition are at Buenos Aires and Cordoba. In 1880 Lorentz visited the Sierra de la Ventana. **Lorentz** and **G. Hieronymus** together investigated the flora of the provinces Tucuman, Salta, Jujuy, and Oran; they passed the tropic up to and beyond Tarija, and went by the Rio

Vermejo into the lowlands of the Gran Chaco to the Laguna del Palmar. Their collections are described by Grisebach in "Symbolae ad floram argentinam," 1879, together with collections of Lorentz from Entre Rios and of Hieronymus from the Sierra de Cordoba, and of **Schickendantz** from Catamarca.

Hieronymus returned to his own country in 1884 and was succeeded by **G. Kurtz**, who has explored and collected in Patagonia, up to the pass of la Cumbre, and to the Rio Salado, etc.

George Downton collected for Veitch (1870-1873). In October, 1871, he started on a mission to Chile to collect a further supply of seed of *Embothrium coccineum*, *Tropaeolum azureum*, *T. tricolor*, and other plants of horticultural interest.

Otto Kuntze in his journey round the world (1874-1876) crossed Chile and Argentina. No general account of his South American travels has been found, but a reference to the following paper has been met with: "Botanische Excursion durch die Pampas und Monte-Formationen nach den Cordilleren," in Potonie's Naturwiss. Wochenschrift, No. 1-3, 1893. In his "Revisio Generum Plantarum," vol. iii, a full list of plants is given and the following localities are mentioned:—Chile: Angol, Ercilla; boundary between Chile and Argentina: pass of la Cruz de Piedra (Paso Cruz); Argentina: Tucuman and Cordoba; Patagonia: Santa Cruz.

Several expeditions have casually touched Chile—e.g., the Austrian "**Donau**" (1868-1871), and the "**Challenger**" (1872-1876). The expedition of the "**Gazelle**" (about 1880) worked in the Magellan Straits, and was accompanied by the botanist **Naumann**, who collected some plants. See Engler's Bot. Jahrb. Bd. 4-6.

The French doctors, **Savatier**, **Hariot**, and **Hyades** (1877-1879) made important collections in the south. See Franchet, "Mission scientifique du Cape Horn." P. A. L. Savatier's collections are at Kew, and an account of his life and travels is given in the *Kew Bulletin*, 1909, p. 148.

John Hall traversed the Chilean coast-belt from Arica to the Magellan Straits, and an account of his tour is given in his book, "Notes of a Naturalist in South America," London, 1887. **Gussfeldt**, in 1882, travelled in the Cordilleras of Central Chile. See his book, "Reise in den Anden," Berlin, 1888.

F. Philippi, son of R. A. Philippi, accompanied his father on many excursions, and also made many of his own in the coast Cordilleras of Valdivia, in the province of Tarapaca (1884-1885), the northern forest regions of Chile (1883), and Atacama (1885). **Carlos Reiche** has made journeys into South Chile and other parts. The first volume of his "Flora de Chile" was published (in Spanish) in 1896, and the work is not yet completed. His excellent work on the phytogeography of the country was published in Engler and Drude, "Vegetation der Erde," vol. 8, 1907. This latter work is in German.

Wilczek (1897) crossed the Andes and collected plants at Saint Raphael and in the valley of the Atuel. See Chodat and Wilczek in Bull. Herb. Boiss. ii. ser., vol. ii. p. 281, 1902, and Briquet in Ann. du Conserv. et du Jard. bot. de Genève, 1900, p. 14.

The Argentine botanist, **C. Spegazzini**, has explored many parts of Argentina and also (1881) Eastern Fuegia. He has, for the most part, published the results of his own researches. His herbarium, which is particularly rich in Cryptogams, is at La Plata.

The Princess Therese von Bayern in 1898 made a journey in Chile and collected plants from the coastal districts, from Antofagasta to Coquimbo, and from the Cordilleras, near the Uspallata Pass. In Argentina she travelled from the Uspallata Pass to Mendoza, and thence to Buenos Aires (*See Beih. Bot. Centrbl. xiii, p. 1, 1902-3*).

N. Alboff has also studied the flora of South Fuegia (1896). **P. Dusen** (1895-1896) investigated the flora on both sides of the Magellan Straits. The results include the publications of 27 new species (largely *Compositae*, *Leguminosae*, and *Gramineae*). **Hatcher** in 1896 and 1897 visited parts of southern Patagonia, and **Nordenskjold**, in 1898, explored from Punta Arenas to Ultima Esperanza, both making botanical collections. For the work of **Skottsberg**, see a summary by the writer in the *Kew Bulletin*, 1919, pp. 268-279.

E. A. FitzGerald was accompanied by **Philip Gosse** in his exploration of parts of the Andes. Gosse collected in the Las Cuevas and Horcones valleys a number of plants which were named by I. H. Burkill, and are now at Kew. *See FitzGerald, "The Highest Andes," pp. 370 seq., 1899.*

H. J. Elwes (1901-1902) collected plants and seeds in a "number of scattered localities belonging to different phytogeographical areas" in Chile and Argentina. His plants are at Kew.

Robert Fries accompanied the Swedish Chaco-Cordillera Expedition (1901-1902), which explored the mountains and high plateaux of the northern provinces of Argentina, especially the province of Jujuy. His plants are partly at Upsala, partly at Stockholm. *See his work, "Zur Kenntniss der alpinen Flora im nordlichen Argentinien," Upsala, 1905.*

In recent years a considerable amount of botanical work has been done by naturalists residing in Chile and Argentina. The work of the Philippis, Reiche, and Spegazzini has been referred to above. Others who should be mentioned are **Echegaray**, who studied the flora of parts of San Juan, **Ave. Lallemand**, who worked in San Luis, and **Boman** in the province of Buenos Aires, particularly at Chacabuco.

E. L. Holmberg has published (1898) a "Flora de la Republic de la Argentina," but this is a general phytogeographical account (in Spanish), and no complete systematic flora of Argentina has appeared. **Reiche's** "Flora de Chile" is purely systematic.

Reference may be made to **Capt. A. W. Hill's** paper, "South America in relation to Horticulture," in the Journal of the Royal Horticultural Society, October, 1911, p. 51, and to the illustrated guide by **C. Thays**, "El Jardin Botánico de Buenos Aires," 1910.

A new work by **Lucien Hauman**, published in 1919, and entitled, "La Végétation des Hautes Cordillères de Mendoza," deals with the flora ecologically, phytogeographically and

systematically. The general part (in French) is extremely interesting reading.

The principal herbaria in Argentina are in the Museum of Cordoba, including types of Grisebach, Lorentz and Hieronymus, and greatly enriched by Kurtz, Niederlein, Holmberg, etc., at La Plata (Spegazzini's plants, etc.) and at Tucuman, where is the herbarium of Miguel Lillo, which is particularly rich in plants of the sub-tropical formations.

The principal herbaria in Chile are in the Museo Nacional, Santiago, and the Museo de Historia Natural, Valparaiso.

REGIONS IN THE ARGENTINA OR CHILE WHICH ARE RELATIVELY UNEXPLORED BOTANICALLY.

The compilation of an account of the botanical exploration in Chile and Argentina has brought out one point very strongly: that Argentina and the Argentine side of the Andes have been much less visited, especially by horticultural collectors, than Chile and the Chilean Andes. This is probably explicable, in part at least, by the fact that the mountains are so much nearer the west than the east coast.

In Argentina the Territory of the Neuquen (Gobernacion del Neuquen) seems the least explored of the southern Andine provinces and might yield some hardy horticultural novelties. The Buenos Aires Great Southern Railway runs from Buenos Aires as far as Senillosa, a little west of Neuquen (1919 map) in the east of the province, and it is projected to carry it to the western frontier. From Senillosa exploration south-west towards the sources of the river Limay and its tributaries and north-west towards the sources of the river Neuquen and its tributaries should yield a great many interesting and new plants. South of the latitude of Chiloe a considerable amount of work has been done and the flora is less rich. The provinces of Mendoza (north of Neuquen) and San Juan have been visited by several botanists. The northern Andine provinces of Catamarca and Jujuy and the territory of Los Andes would certainly yield many new plants, but these, except on the higher mountains would tend for the most part to be of a more sub-tropical character. The northern and north-eastern province of Salta, the territories of Formosa, Chaco and Misiones, and the provinces of Corrientes have apparently been little explored botanically and certainly very little visited by European collectors. The flora is here sub-tropical. The central provinces (Buenos Aires, Cordoba, Santa Fé, San Luis, and the Territory of the Pampas) have been relatively well worked, but even in these there must be many species of horticultural value which have never been introduced into Europe. In the southern provinces (territories of the Rio Negro, of the Chubut and Santa Cruz, *i.e.*, "Patagonia") there is a poorer flora and few good lines of communication.

Chile, with its long coast-line, narrow width and many ports, may be said to have been well explored, and it is difficult to give preference to any of the provinces. Certainly, whatever part of the Andes might be visited, some plants new to European horticulture could be obtained, but the desert northern provinces of

Tarapaca and Antofagasta, and the region of the Llanquihue lakes, appear to have been less visited than most districts.

To sum up: the impression obtained by the studies detailed above is that the two areas most likely to provide a large number of new plants are: (1) the territory of the Neuquen (hardy plants), and (2) the province of Jujuy (sub-tropical and montane plants).

IX.—DECADES KEWENSES

PLANTARUM NOVARUM IN HERBARIO HORTI REGII CONSERVATARUM.

DECAS XCV.

941. ***Stellaria Wallichiana*, Haines** [Caryophyllaceae-Alsinoidae-Alsineae]; species *S. mediae*, Vill., et *E. neglectae*, Weihe, affinis; ab his sepalis petalisque 4, sepalis ovatis sine marginibus scariosis, petalis saepe potius emarginatis quam 2-fidis, foliis omnibus petiolatis basi late subcordatis sed versus petiolum cuneatis differt.

Herba tenuis, procumbens, caulibus pubescentibus pilis eglandulosis plus minus in duas lineas confertis atque pilis glandulosis dispersis. *Folia* omnia petiolata, ovata vel ovato-lanceolata, 1-2.5 cm. longa, basi late cordata, in petiolum autem cuneata; petiolus tenuis, pubescens. *Flores* solitarii, pedicellis bis vel quinque quam sepalis longioribus. *Sepala* 4, ovata, interdum subito acuminata, 2.5-3 mm. longa. *Petala* 4, ovata, 2-fida vel solummodo emarginata. *Stamina* hypogyna. *Ovarium* ovoideum, stylis 2-3 recurvatis. *Capsula* sepalis brevior, (4?)-6-valvis. *Semina* 3-12, muricata (non granulata ut in *S. media*, Hook. f.) *Alsinella Wallichiana*, Benth. in Wall Cat.; *S. media*, Hook. f. Fl. Brit. Ind. partim.

INDIA. Sylhet, Wallich 630; Bengal Rungpore, Clarke 26820, Purneah, Haines 5161. In damp places.

942. ***Aspidopterys Hutchinsonii*, Haines** [Malpighiaceae]; species *A. obcordatae*, Hemsl., arcte affinis sed paniculis brevibus densioribus, pedicellis fructiferis brevioribus, sepalis dorso pubescentibus, samararum nervis paucioribus minus reticulatis distinguitur.

Frutex scandens, caulibus pilorum delapsorum cicatricibus asperis juventute lanuginosis. *Folia* orbiculari-obovata, subito cuspidata, 7-11 cm. longa, saepe latiora, basi truncata vel rotundata, non cordata, apice praeter cuspidem obtusissima vel leviter retusa, juventute utrinque dense flavo-tomentosa, mature-scentia subtus hirsuto-pubescentia, supra glabrescentia; nervi laterales circa 4-5 quorum unus prope basem. *Petioli* circa 2 mm. longus. *Paniculae* breves (nostris in exemplis foliis breviores), ferrugineo-pubescentes; pedicelli circiter 1.5 cm. longi, 3 mm. supra basem articulati, infra articulationem hirsuti, supra articulationem fere glabri vel glabri. *Sepala* oblongo-lanceolata, 1.4 mm. longa, dorso longe pubescentia. *Petala* oblonga vel elliptico-oblonga, 4.5-5 mm. longa. *Stamina* petalis multo breviora,

glabra. *Ovarium* glabrum, minute alatum. *Samara* ut in *A. obcordata*, Hemsl., sed nervi laterales plus distincti, minus reticulati et carpophorium acuminatum, 4 mm. longum.

INDIA. Orissa; mountains of Mayurbhanj, *Haines*.

This species might perhaps be considered as an extreme western form of *A. obcordata*. In the type of that species the leaves are cordate both at the base and at the apex; examples from Siam are only cordate at the base, while some Burmese specimens show some leaves cordate at the base, others rounded and with the apex either slightly retuse or even obtuse. In all these, however, the sepals are glabrous and the panicles large and lax.

943. ***Tetrastigma alcicorne***, *Haines* [Ampelidaceae-Vitoidae]; species *T. lanceolariae*, Planch., *T. Thomsonianae*, Planch., *T. bracteolatae*, Planch., affinis; ab omnibus foliorum rhachi longa, extremo foliolo obovato subito acuminato, petalis neque cucullatis nec calcaratis, ab unoquoque aliis characteribus differt.

Frutex scandens, caulibus paulum complanatis glabris, cirris foliis oppositis simplicibus. *Folia* trifoliolata, nitentia, glabra, rhachi cum petiolo extremo 2-3 cm. longo, petiolo 5-8 cm. longo; foliola 8-10 cm. longa, in parte superiore leviter crenata denticulataque, obtusa, subito caudata, foliolo extremo obovato, nervis lateralibus utrinque 4-6. *Cymae* 2.5-6.5 cm. longae, petiolis breviores vel iis aequilongae, puberulae, sessiles vel brevissime pedunculatae, ramulis, saepe complanatis atque sursum gradatim latioribus (aleis cornubus similibus). *Bracteae* 1.3-1.6 mm. longae. *Flores* dioici, tetrameri, viridi-albi, 1.3 mm. longi. *Calyx* patelliformis, vix vel leviter 4-lobatus. *Petala* oblongo vel lanceolato-oblonga, puberula, in mediis concava, apicibus patentibus minute mucronatis vel muticis; discus obscurus. *Stigma* latum, lobis 4 distinctis acutis vel obtusis. *Fructus* non visus.

INDIA. Champaran; near the Nepal Hills, *Haines*, 3961.

944. ***Oldenlandia anamalayana***, *Gamble* [Rubiaceae-Hedyotidiae]; *O. Lessertrinae*, O. Kze., affinis sed minor, foliis tenuioribus haud plicatis, floribus minoribus in cymulas parvas dispositis nec umbellatis, pedicellis gracilibus bracteolatis.

Arbuscula glabra, ramulis tetragonis, ultimis compressis. *Folia* lanceolata, acuminata, 7-11 cm. longa, 2-4 cm. lata, nervis utrinque 5-7 obliquis parallelis supra impressis; petiolus 1-1.5 cm. longus; stipulae inferiores tubulosae, marcescentes, ad 1 cm. longae, dentibus paucis subulatis, superiores ad basim fissae, inde triangulares, dentatae, omnes scariosae. *Flores* parvi, in cymrum paniculis corymbosis terminalibus vel in cymis e nodis ultimis pedunculatis; pedunculi 1-1.5 cm. longi; pedicelli graciles, 2 mm. longi; bracteae foliaceae, lanceolatae; bracteolae lineares, minutae. *Calycis* limbus campanulatus, 1 mm. longus, dentibus minutis ovatis. *Corollae* tubus cylindricus, 4 mm. longus; lobi lanceolati, intus ad tubi faucem barbati, patentes vel recurvi. *Stamina* exserta, filamentis longis, antheris medio affixis oblongis. *Stylus* gracilis, stigmatibus 2 linearibus. *Cap-sula* dicocca, circiter 2 mm. longa, in quodam cocco placentae

oblongae, seminibus paucis. *Hedyotis Lessertiana*, Beddome Icones Plant. t. 31, non Arnott.

SOUTH INDIA. Anamalai hills, in higher ranges, *Beddome* in Herb. Madr., coll. 1872.

This seems to be distinct from *O. Lessertiana* and to be the plant figured by Beddome, which figure Trimen refused to quote as "scarcely appearing to represent any form of this species" (*Hedyotis Lessertiana*, Arn., Trimen Fl. Ceylon, ii. 309).

945. **Oldenlandia Barberi**, *Gamble* [Rubiaceae-Hedyotidieae]; species distincta, lignosa, facie *O. buxifoliam*, O. Kze., et *O. quinquenerviam*, O. Kze., ob folia parva ad apices ramulorum congregata referens, ab utraque specie cymis trifloris sessilibus axillari-bus et stipulis non pectinatis differt.

Arbuscula lignosa, ramulis didi-vel trichotomis curvatis griseis cicatricibus foliorum delapsorum notatis. *Folia* ad apices ramulorum congregata, percoriacea, ovata, apice obtuse acuta, basi obtusa et decurrentia, margine conspicue incrassata, 2-3 cm. longa, 1-1.5 cm. lata; costa crassa, nervis utrinque 4-5 obliquis perobscuris; petiolus haud ullus; stipulae orbiculares, margine glandulis nigris ornatae et intus ad medium glandularum annulo notatae, conspicue marcescentes albae. *Cymae* axillares, triflorae, bracteolis 2 subulatis ad basim ornatis, pedicellis brevibus 2-3 mm. longis. *Calycis* tubus infundibularis, lobis 4 lanceolatis acuminatis glabris 2 mm. longis. *Corollae* tubus cylindricus, 3 mm. longus; lobi ovati, acuti, 3 mm. longi, fauce paulo puberuli. *Stamina* vix exserta, subsessilia, antheris oblongis. *Stylus* simplex, stigmatibus 2 parvis brevibus. *Capsula* glabra, non protrusa, seminibus paucis.

SOUTH INDIA. Agastiamalai peak, on the boundary between Travancore and Tinnevely, at about 1500 m. alt., May, 1901. *C. A. Barber* 2926.

946. **Knoxia linearis**, *Gamble* [Rubiaceae-Knoxieae]; *K. Wightianae*, Wall., affinis, sed pubescens, foliis angustioribus linearibus, stipulis elongatis pubescentibus et mericarpiis vix separantibus differt.

Herba perennis, erecta, pubescens, ramis multis gracilibus tere-tibus, e caudice lignoso. *Folia* sessilia, linearia vel aliquando lineari-lanceolata, ad 6 cm. longa, 3-8 mm. lata, nervis utrinque circiter 5 perobliquis scabris; stipulae ovatae, acuminatae, margine pinnatisectae, 2 mm. longae. *Flores* in corymbis terminalibus racemiferis di-trichotomis ad 4 cm. longis. *Calycis* tubus brevis, campanulatus; lobi breves, unus longior. *Corollae* tubus anguste infundibularis, 3 mm. longus, intus parce villosus; lobi breves in alabastro incurvi, demum patentes. *Stamina* exserta; filamenta e fundo corollae tubi gracilia; antherae oblongae. *Stylus* gracilis, stigmatibus 2 ovatis. *Fructus* ovoideus, mericarpiis 2 connatis vix separantibus, facile integer a columella centrali persistente solutus; pericarpium membranaceum, siccitate rugosum.

SOUTH INDIA. Mahendragiri hills in Tinnevely District. September 17, 1916. *K. Rangachari* 13168.

947. **Jasminum Parkeri**, Dunn [Oleaceae] *J. humili*, Linn., affinis sed floribus solitariis distincta; *J. fruticanti*, Linn., etiam similis sed calycis dentibus multo brevioribus et pubescentia differt.

Frutex 15–30 cm. altus. *Ramuli* intricati, striati, cum foliis calycibusque puberuli. *Folia* alterna, coriacea, 3–5-foliolata, 1–2 cm. longa; foliola ovata, obtusa, obscure mucronata, 3–6 mm. longa. *Flores* terminales et axillares solitarii; bracteae minutae; pedunculi calyce breviores. *Calyx* 2–3 mm. longus, urceolatus; tubus 5-costatus, dentibus subulatis bis longior. Corolla 2–3 cm. longa, aureo-flava, lobis tubo bis brevioribus. *Bacca* didyma, carpellis 3 mm. diametro ellipsoideis, albido-viridibus, translucen- tibus.

INDIA. Chamba State: lower part of upper basin of the Ravi; Tiari, Barmaor, on dry ground among boulders, 800 m. R. N. Parker, July, 1919. (Fl. June.) Mr. Parker notes its occurrence in other places in the same valley.

948. **Pseuderanthemum Dawei**, Turrill [Acanthaceae-Pseuderanthemeae]; affinis *P. elliptico*, Turrill, sed foliis majoribus, inflorescentia paniculata, calyce minore segmentis membranaceis, corolla infundibuliformi distinguitur.

Herba erecta, caulibus teretibus inferne glabris vel leviter puberulis superne hirsutis. *Folia* elliptica, apice gradatim acuminata, basi in petiolum 1.2 cm. longum angustata, usque ad 16 cm. longa et 5.7 cm. lata, costa in pagina superiore sulcata, inferiore prominente, nervis lateralibus utrinque circiter 10–12 in pagina utraque prominentibus marginem versus sursum curvatis, nervis tertiariis subparallelis, supra glabra, infra in costa nervisque puberulis alioqui glabra. *Inflorescentia* paniculata, 1.6 dm. longa, multiflora, puberula; bracteae lineari-lanceolatae, 2.5 mm. longae; bracteolae vix 1 mm. longae; pedicelli 1.5–2 mm. longi. *Calyx* fere ad basem 5-fidus, segmentis lanceolatis acutis 3 mm. longis membranaceis extra puberulis. *Corolla* anguste infundibuliformis, extra glanduloso-puberula, tubo 8 mm. longo basi 1.3 mm. fauce 2.3 mm. diametro, lobis subaequalibus elliptico-ovatis 6 mm. longis 4 mm. latis, abaxiali leviter latiore. *Stamina* fertilia duo 3 mm. supra tubi basem inserta, filamentis 0.5 mm. longis, antheris 1 mm. longis; pollinis granula ellipsoidea 32 μ longa 25 μ diametro. *Discus* brevis-simus. *Ovarium* cylindricum 1.5 mm. altum, 0.75 mm. diametro, minutissime puberulum; stylus 3 mm. longus, inferne patule puberulus.

COLOMBIA: Cauca Valley, fl. April, M. T. Dawe 847.

949. **Pseuderanthemum ellipticum**, Turrill [Acanthaceae-Pseuderanthemeae]; species *P. lanceo*, Turrill, comb. nov. (*Eranthemo lanceo*, Nees), valde affine sed foliis ellipticis vel elliptico-oblan-ceolatis basi gradatim angustatis, in pagina utraque glabris, calycis lobis longioribus, corolla hirsutiore differt.

Herba erecta, caulibus teretibus inferne fere glabris superne leviter hirsutis. *Folia* elliptica vel elliptico-oblan-ceolata, apice acuminata, basi in petiolum plus minusve 1 cm. longum gradatim

angustata, usque ad 8 cm. longa, et 2.6 cm. lata, in pagina utraque glabra, costa in pagina superiore sulcata; inferiore prominente, nervis lateralibus utrinque circiter 8 infra prominentibus supra subprominentibus, nervis tertiariis reticulatis. *Inflorescentia* fere spicata, hirsuta, usque ad 1.6 cm. longa; bracteae lanceolato-lineares, 4 mm. longae; bracteolae subulatae, 1.5 mm. longae; pedicelli brevissimi. *Calyx* fere ad basem 5-fidus, segmentis lanceolato-linearibus acutis 6 cm. longis dense glandulose-hirsutis. *Corolla* alba, extra dense hirsuta, tubo cylindrico in parte superiore leviter ampliato 1 cm. longo basi 1.3 mm. fauce 2 mm. diametro, lobis subaequalibus 6.5 cm. longis 3-4.5 cm. latis. *Stamina* fertilia duo 7 mm. supra tubi basem inserta, filamentis 1 mm. longis, antheris 2 mm. longis; pollinis granula ellipsoidea 52μ longa 32μ diametro. *Discus* inconspicuus, vix 0.5 mm. altus. *Ovarium* cylindricum, 2 mm. altum, 0.75 mm. diametro, minutissime puberulum; stylus 1.1 cm. longus, inferne hirsutus.

COLOMBIA. Fusagasuga, white hedgerow flower in lanes and paths between coffee plantations, fl. April, Mrs. J. A. Tracey 24; Arizal, in forest shade, 1700 m., fl. May, Kalbreyer.

950. **Lasiococca Comberi**, Haines [Euphorbiaceae-Acalyphae]; affinis *L. symphylliaefoliae* Hook. f., sed foliis multo latioribus, floribus feminis saepe subcorymbosis nec glandulosis, sepalis exteris fructiferis brevioribus latioribus, capsula matura tuberculata, tuberculis uno aut ad summum duobus pilis simplicibus exceptis glabris, differt.

Arbor parva, trunco erismis instructo cortice pallido, ramulis albis juventute dense pubescentibus. *Folia* subverticillata, obovata vel elliptica, acuminata, basi cordata, 9-20 cm. longa, 4.5-6.5 cm. lata, glabra, nervis lateralibus 10-30 utrinque, petiolo tomentoso brevissimo. *Racemi* ♂ 3-6 cm. longi, axillares (etiam in foliorum delapsorum axillis); rhachi pedicellisque pubescentibus; bracteae 3 mm. ovatae, obtusae; pedicelli articulati, 3-5 mm. longi. *Calyx* in alabastro apice extremo pubescens, ceterum glaber; sepalia circa 7 mm. longa, elliptica v. elliptico-oblonga. *Pedunculi* ♀ pubescentes, non-glandulosi, 1.6-2.6 cm. longi, ramulorum versus apices axillares vel ad perularum deciduarum axillas subcorymbosi, bracteis parvis 1-2 lanceolatis instructi. *Sepala* inaequalia, exteriora late ovata, subito acuminata, paucis ciliolis exceptis glabra. *Ovarium* leviter trilobum, minute squamatum vel tuberculatum, tuberculis apicibus 1-2 setis simplicibus instructis; styli extus leviter setulosi. *Capsula* triloba, circa 1.2-1.3 cm. diametro, tuberculata, demum glabra. *Semina* brunnea, globosa.

INDIA. Orissa: Angul; in rocky ravines of the mountains of Mayurbhanj, Comber.

This species is named after Mr. Comber, of the Indian Forest Service, who kindly visited one of the localities in Angul, where it grows, until he had collected all stages of the flower and fruit. By the specimens thus obtained I am now able to supplement and slightly modify the description of the genus as originally published in Hooker's *Icones* (Vol XVI, 1887, Pl. 1587).

Lasiococca, Hook, f. Flores monoiti vel dioici, apetalī, ♂ racemosi, racemis lateralibus, ♀ solitarii, pedunculati, axillares v. subcorymbosi ad ramulorum novorum apices. Fl. ♂: Calyx globosus, valvatis tripartitus. Discus 0. Stamina perplurima, centro floris inserta, antheris in phalanges ramosissimas dispositis, loculis globosis subdivaricatis, connectivo loculos cingente. Pistilodium 0. Fl. ♀: Sepala 5-7 inaequalia, persistentia et aliquantum accrescentia. Ovarium globosum vel leviter 3-lobum; styli 3, filiformes, erecti, intus stigmatosi. Ovula in loculis solitaria. Capsula demum 3-cocca; cocci a triquetra columella decidui, dehiscentes, setis crassis spiculiferis vel tuberculis operti. Semina subglobosa laevia, testa tenuiter crustacea; hilum latum; raphe linearis; carunculus 0. Albumen carnosum. Cotyledones magni, orbiculares, subcordati, plani, tenues. Folia subverticillata, rarius alterna v. subopposita, breviter petiolata, oblanceolata vel obovata, acuminata, basi cordata, integerrima.

Species 2, Indiae Orientalis incolae.

X.—MISCELLANEOUS NOTES.

MR. M. VARDY, a member of the gardening staff of the Royal Botanic Gardens, has been appointed by the Secretary of State for the Colonies, on the recommendation of Kew, Assistant Superintendent of Agriculture, Grenada.

DR. JOHN H. WILSON.—It is with great regret that we have learnt of the death of this well-known agriculturist who, since 1900, was Lecturer in Agriculture and Rural Economy in the University of St. Andrews. Some particulars of his life and work are given in the obituary notices that appeared in the "Gardeners' Chronicle" for 31st January, 1920, p. 59, and in "Nature" for 22nd January, p. 539. Dr. Wilson was a native of St. Andrews, and died there after a short illness on 13th January at the age of 61. He was the first Botanical Lecturer in the University, and laid out its original Botanic Garden; he was also, for some time, Demonstrator in Zoology. His most important work, however, was directed to the improvement of the potato and other important food plants. Of the potato he was successful in raising several fine varieties which have become well-known.

In the note on presentations to the library, published in the *Kew Bulletin*, 1913, p. 62, reference is made to a thick foolscap-folio volume of manuscript and printed matter relating to the Royal Botanic Gardens, Kew, once the property of John Smith, Curator of the Gardens from 1841 to 1864, who was the author of a considerable portion of it. The establishment is indebted to Dr. Wilson for this interesting accession, which was the subject of a note by Dr. Hemsley in the *Bulletin* for 1914, p. 85.

Taiwania cryptomerioides, Hayata.—A healthy young plant of this new and very interesting conifer was received in December last from the Arnold Arboretum. It is one of a few living plants introduced to that institution by Mr. E. H. Wilson during his recent visit to Formosa. Seeds also were collected by Mr. Wilson and widely distributed by the Arboretum, but of those received at Kew not one germinated; nor have we learnt that any better result has been obtained elsewhere. It seems, therefore, that the plant just received will represent the first introduction of this tree in a living state to Britain.

Taiwania cryptomerioides was originally described by Hayata in the Journal of the Linnean Society, vol. xxxvii. p. 330 (1906), plate xvi. It appears to have been first discovered on the western slope of Mount Morrison in Formosa, at about 6500 feet elevation. There are some very good cone-bearing shoots preserved in the Kew Herbarium, collected in 1912 by Mr. W. R. Price. The tree has two distinct types of foliage—juvenile and adult. The young plant at Kew has nothing but the former, the leaves being awl-shaped, flattish but slightly thickened up the middle, $\frac{3}{8}$ – $\frac{1}{2}$ inch long, $\frac{1}{16}$ inch wide at the base, tapering gradually to the slender, sharply-pointed apex. Several lines of stomata on each surface give the leaves a greyish tinge. At this stage the leaves in shape and arrangement strongly suggest *Cryptomeria*. On the adult, cone-bearing shoots the leaves are quite different, and in shape, size and arrangement are very like those of *Athrotaxis laxifolia*; they are only $\frac{1}{8}$ inch long, stout, keeled at the back, incurved and bluntish at the apex. The cones are oval $\frac{3}{8}$ – $\frac{1}{2}$ inch long, the scales roundish-obovate, $\frac{1}{8}$ – $\frac{3}{16}$ inch wide. In structural detail Hayata observes that the cones most nearly approach those of *Cunninghamia*. In external appearance they suggest small cones of *Tsuga*.

According to a note in the Journal of the Arnold Arboretum, vol. i, p. 66, the *Taiwania* is the tallest tree in the world outside California and Australia and is, in its young state, one of the most beautiful of all conifers. It will have to be grown in the Temperate House at Kew, and is only likely to be hardy in this country in the south-western counties, the Scilly Isles and similarly mild localities.

W. J. B.

Bluff et Fingerhuth, Compendium Florae Germaniae. ed. 2.

—The first section of Bluff and Fingerhuth's Compendium, ed. 1, comprising the Phanerogams, appeared in 1825, under the auspices of C. G. and Th. Fr. Nees ab Esenbeck,* and in spite of rather unfavourable criticism† seems to have met a definite want‡ and received sufficient support to warrant the publication of a second edition.

The second edition, edited by Bluff, C. G. Nees and Schauer, appeared in 1836–8. and was very favourably noticed, the reviewer

* Flora, 1825, i. Beilage, pp. 90–93.

† *Ib.*, ii. pp. 714–718.

‡ *Ib.*, ii. pp. 640, 685.

stating that it was the most complete flora of Middle Europe, and the only one arranged according to the Linnean system.*

In 1837, however, W. D. J. Koch published his *Synopsis Florae Germanicae et Helveticae*, which at once became the standard work on the subject, passing through three Latin and three German editions, the latest of which appeared in 1892-1907.

The second edition of Bluff and Fingerhuth's *Compendium* was thus immediately superseded, and passed into oblivion. As showing how little it was consulted by botanists of the day, it may be mentioned that Sir W. J. Hooker's copy was still uncut at the date of his death.

Though the immediate success of Koch's *Synopsis* was due mainly to its high intrinsic merits, it was undoubtedly helped by his adoption of the Candollean system of arrangement in preference to the Linnean, which had at that date become obsolete, except for the purposes of a *clavis*, for which it still has its uses.†

The second edition of Bluff and Fingerhuth's *Compendium* does not appear to have been consulted during the compilation of the *Index Kewensis*, which consequently does not contain the following names proposed by Bluff, C. G. Nees and Schauer. These will be included in the sixth supplement of the *Index*.

NAMES PUBLISHED IN BLUFF ET FINGERHUTH, COMP. FL. GERM.,
ED. 2, WITH THEIR MODERN EQUIVALENTS,

Alsine banatica, l.c. i. pars 2, p. 99 (1837) = *Minuartia setacea*, var. *banatica*, Hayek.

Alsine graminifolia, l.c. 96 = *Arenaria graminifolia*, Schrad.

Armoracia austriaca, l.c. ii. p. 27 (1838) = *Nasturtium austriacum*, Crantz.

Armoracia glastifolia, l.c. 26 = *Cochlearia glastifolia*, Linn.

Avena Cavanillesii, l.c. i. pars 1, p. 143 (1836) = *Trisetum Cavanillesii*, Trin.

Critamus ammoides, l.c. 513 = *Ptychotis ammoides*, Koch.

Critamus latifolius, l.c. ii. p. 751; index, p. 46 (1838) = *Falcaria latifolia*, Koch.

Diplotaxis arvensis, l.c. ii. p. 103 = *Moricandia arvensis*, DC.

Eleocharis alpina, l.c. i. pars 1, p. 92 (1836) = *Scirpus alpinus*, Schleich.

Eleocharis Lereschii, l.c. ii. p. 746 (1838) = *Scirpus atropurpureus*, Retz.

Erianthus strictus, l.c. i. pars 1, p. 105 (1836) = *Erianthus Hostii*, Griseb.

Erucastrum balearicum, l.c. ii. p. 101 (1838) = *Brassica Robertiana*, J. Gay.

Isolepis australis, l.c. i. pars 1, p. 82 (1836) = *Scirpus Holoschoenus*, var. *australis*, Koch.

Isolepis exserens, l.c. 81 = *Scirpus Holoschoenus*, var. *australis*, Koch.

Isolepis filiformis, l.c. = *Scirpus Holoschoenus*, var. *filiformis*, Aschers. et Graebn.

* Flora, 1839, i. *Intelligenzbl.* p. 43.

† Prain, *Bengal Plants*, i. pp. 21-164 (1903).

Isolepis Linnaei, l.c. 82 = *Scirpus Holoschoenus*, var. *Linnaei*, Aschers. et Graebn.

Lepigonum segetale, l.c. i. pars 2, p. 92 (1837) = *Spergularia segetalis*, Fenzl.

Lobularia halimifolia, l.c. ii. p. 13 (1838) vice *L. halimifolia*, Steud. (1841.)

Moehringia sphagnoides, l.c. i. pars 2, p. 102 (1837) = *Moehringia ciliata*, var. *nana* (Gaud.).

Ranunculus calthaeifolius, l.c. 295 vice *R. nudicaulis*, Rouy et Fouc.

Sorbus sudetica, l.c. 178 vice *S. sudetica*, Nyman (1879).

TERMS.

Flora of Sweden.*—Under the authorship of Dr. C. A. M. Lindman, a useful work on the flowering plants of Sweden has just come to hand. It is published in a practical form which should commend itself to students of the Scandinavian flora. A most useful feature is a large number of well-drawn and tastefully-arranged black-and-white text figures which, used in conjunction with the keys to genera and species, should make identification easy even to the inexperienced botanist. It seems a little quaint, though altogether charming considering the subject, to be confronted at the beginning of the work with a family key based on Linnaeus' artificial sexual system. For instance, the figures illustrating the genera of "Klass 2, *Diandria*, *Monogynia*," associate such a motley of types as *Veronica*, *Utricularia*, *Lepidium*, *Coronopus*, *Lemna* and *Cypripedium*. The families are arranged after Engler's system. Dr. Lindman has had the assistance of several specialists, whose names appear in the elaboration of such typical Scandinavian genera as *Hieracium* and *Taraxacum*, and in the case of *Rubus*, *Rosa*, *Salix* and a few smaller genera. Compared with *Rosa* (by S. Almquist), 205 species, and *Taraxacum* (by Dahlstedt), 99 species, the genus *Hieracium* (by Dahlstedt) seems surprisingly small with only 89 species.

J. H.

Flora arabica.†—In this compilation Father Blatter begins to bring together the citations, synonyms, and such collectors' records as were available of all the plants known in Arabia. There has been no complete Flora of the district published since 1775 when Forskal's *Flora Aegypto-Arabica* appeared, and anyone determining plants from this large area had to undertake considerable research before the works of the various authors concerned could be consulted. Now we have the Flora brought up to date and can approach the subject with some confidence, as the work has been carefully done.

The sequence of orders and genera follows Bentham and Hooker's *Genera Plantarum*, the present part dealing with *Ranunculaceae-Moringaceae*. In the next part we are promised

* C. A. M. Lindman. *Svensk Fanerogamflora*, pp. 639. Stockholm, 1918.

† *Flora Arabica*, Ethelbert Blatter, S.J., F.L.S., Part i. Records of the Botanical Survey of India, viii. 1-123.

a map showing the phyto-geographical divisions, and the author has notes on the history of botanical exploration in Arabia and a general sketch of the vegetation which he hopes to deal with at the end of the list.

In a country like this, where the months of flowering and fruiting depend so much on the dates of the rare falls of rain, and where even rainless years occur, the author has properly included the years as well as the months in which each species flowered or fruited. S. T. D.

The Flora of Madras, Part III.—The issue of the first and second parts of the Flora of Madras has been already noticed in the *Kew Bulletin*, 1916, pp. 57-65, and 1918, pp. 222-228. The present contribution commences with a continuation of the *Leguminosae* begun in part ii, and closes with *Caprifoliaceae*. This arrangement, though making the part a little smaller than those which preceded it, is convenient in leaving the next one to begin with the important order *Rubiaceae*, and will probably enable botanists to have this and the *Compositae* complete in the same bound volume. The inclusion in this part of such important woody orders as *Combretaceae* and *Myrtaceae* will render it of special value to foresters. The author's well-known acquaintance with the trees of the district under forest conditions, added to an exact botanical treatment of the subject, will make the pages devoted to such genera as *Terminalia* of great practical use.

One of the most valuable parts of these local Indian floras has been the inclusion of good keys to orders, genera and species. Their construction requires a wide and accurate knowledge of the living plants, coupled with discretion and patience. S. T. D.

Identification of the Economic Woods of the United States.*—This work was originally undertaken with the view that it might be accepted as a text-book for forestry students and others interested in the study and identification of woods, the subject matter being selected by the author from the notes used by him in a series of lectures on Forest Products given at the Yale Forest School. The first edition appeared in 1912, and the present volume, while including all the salient points of the original work, brings up to date the knowledge of United States woods gained since that time. As a good deal of research work on the structural and physical properties of United States woods has been carried out in the intervening years, it necessitated re-writing and rearranging the key, whilst advantage has been taken of the opportunity of adding to the number of woods described, and of including references to literature on the subject which has appeared during the last few years.

* Identification of the Economic Woods of the United States, including a discussion of the Structural and Physical Properties of Wood, by Samuel J. Record, M.A., M.F., Professor of Forest Products, Yale University, 2nd edition, revised and enlarged. New York, John Wiley & Sons, Inc.; London, Chapman & Hall, 1919. Price 8s. 6d. net.

The present work is divided into two main parts. The first part deals with the more important structural and physical properties of wood, and includes a general description of a tree, then separate descriptions of different parts such as pith, bark, primary wood, cambium, vessels, tracheids, wood fibres, wood parenchyma, rays, resin ducts, pits, tyloses, pith flecks, growth rings, heartwood and sapwood, the important particulars in each case being illustrated by figures of the parts magnified 200–250 diameters. Subjects such as grain and texture, knots, density and weight, water content, shrinkage, warping and checking, hygroscopicity, permeability, conductivity, resonance, colour, lustre, scent and taste are also discussed.

The second part is devoted to a key which includes all the important, and some of the unimportant, woods of the United States. By means of this key it is possible to place a wood fairly correctly in its genus and into a group of species, but, except in the case of species with very distinct characters, it does not remove the difficulty of the identification of species by means of wood characters alone. This is recognised by the author, for in his introductory remarks the words occur, “in the woods of many genera the structural variations apparently are not sufficiently distinct and constant to assure specific identification. Good examples of this are afforded by the woods of *Pinus*, *Quercus*, *Hicoria*, and *Populus*, where it is usually difficult and very often impossible to do more than separate them into groups. Accurate knowledge of the botanical and commercial range of each species will often serve as a basis for further sub-division of a group in which other distinctions are apparently wanting.” This emphasises the necessity for definite information regarding the source of origin, together with common name and port of shipment of specimens of wood submitted for identification. It is also of great assistance in the identification of lesser-known woods when specimens of foliage, flowers and fruit accompany the specimens.

Following the key is a long bibliography referring to “Woods in General” and to the “Uses of the Woods of the United States and Canada,” an appendix dealing more fully with various features referred to earlier in the work, a good index, and several plates showing wood structure.

The volume may be regarded as a very useful addition to the literature on the Identification of Woods, and it will be found valuable, not alone to students in the United States, but also to those in other countries. W. D.

The Journal of Pomology.*—The cultivation of fruit was never so important an industry in this country as it is to-day, and, although probably at no period has it shown finer results, the cultivator has not in recent times been well supplied with up-to-date literature in his own special line, offered to him at any rate

* The Journal of Pomology. Edited by Edward A. Bunyard, F.L.S. Maidstone, George Bunyard & Co., Ltd. Published quarterly.

in compact form. In the horticultural press it is but one of many interests that jostle for recognition, and all the great standard works on the subject are so old that they fail to meet the needs of the student who would keep abreast with the times and who needs something more than the ordinary manuals at present available, admirable as some of them are.

Mr. Bunyard's new publication, therefore, comes most opportunely, and will be warmly welcomed. No one could possibly be better fitted for the editorial task than he. He has all the practical knowledge which comes to one born and bred in a great fruit nursery, he has a wide knowledge of ancient and modern pomological literature, both native and foreign, and, as we knew before this new journal appeared, himself possesses an enviable literary gift.

The *Journal* is of small quarto size, and the first number has sixty-four pages excellently printed and illustrated by one plate and several line engravings. The opening article is one by Miss Ida Sutton, dealing with self-sterility in plums, cherries and apples, a very important question; it is based on work carried out at the John Innes Horticultural Institution. There is an article on Seedless Raisin Grapes, and another by Dr. H. E. Durham on the problem of recognising fruits. Mr. E. A. Bunyard himself contributes a note on a congenial subject—an early eighteenth author and his book, Van Oosten and "The Dutch Gardener"—and another on the length of stem in pears and apples. Other items are reviews of current literature, News and Notes, a Report of the recent Pomological Conference at Metz, the whole constituting a most useful and interesting exposition of current pomological lore.

W. J. B.

Science and Fruit Growing.*—A copy of this work has been presented to the Kew Library by the authors. It is a valuable summary of the experimental work done at the Woburn Fruit Farm since its foundation in 1894. From time to time Reports have been issued—sixteen in all, the first in 1897, the last in 1917—and there is still one to appear. Some of these are now out of print and, in any case, it is a great convenience to have the results of this long series of experiments condensed in one volume. The book is of more than ordinary interest because the conclusions arrived at by the authors have in several instances run counter to ancient and accepted maxims. This is notably the case in regard to transplanting and manuring. In late years much interest has been aroused by the Woburn experiments showing the influence of grass on trees and the action of one plant on another. Probably all the conclusions of the experimenters will not be universally accepted, but even if they are not, their publication has led cultivators to ponder more earnestly than ever before on the why and the wherefore of various methods of

* Science and Fruit Growing. Being an account of the Results obtained at the Woburn Experimental Fruit Farm since its foundation in 1894. By the Duke of Bedford, K.G., F.R.S., and Spencer Pickering, M.A., F.R.S. London, Macmillan.

culture which had become simply matters of routine. Nothing but good can come from that. No section of the Woburn experiments has conferred greater benefit on garden practice than those dealing with insects and parasitic fungi, matters in which Mr. Pickering's knowledge of chemistry has been of the highest value. The book is copiously illustrated by reproductions of photographs, and is to be strongly recommended to all interested in fruit cultivation.

We understand from the preface that although it is no longer possible to continue the Farm on its original basis, the work will be carried on for the present on nearly the same lines and by the same managers as heretofore, but under the ægis of the Board of Agriculture and the Development Commissioners, the funds being provided by Government.

W. J. B.

Wheat in East Africa.—Bulletin No. 4 of the Department of Agriculture, Nairobi, British East Africa, is a pamphlet of 16 pages, by Mr. W. J. Dowson, M.A., F.L.S., giving a concise summary of various reports and papers dealing with the cultivation of wheat in British East Africa.

Wheat was introduced into the Highlands of East Africa more than 20 years ago by missionaries, but after a few years the crops were almost invariably destroyed by the "Black Stem Rust" (*Puccinia graminis*). A wheat of Italian origin, known as "Rieti," was found to be a promising variety from the point of view of its resistance to rust, and was used as one of the parents in many hybridization experiments on Mendelian lines, which were commenced by Mr. G. W. Evans, and from 1913 continued by Mr. Dowson. Of more than 20 hybrids, only the following proved to be satisfactory—*i.e.*, really resistant to rust in a high degree, and at the same time fair croppers of good milling grain:—

1. Selections from Rieti crossed by Thew.
2. Selections from Early Rieti crossed by Thew.
3. Selections from Rieti crossed by Red Fife.
4. Selections from Egyptian No. 3 crossed by Nut Cut.
5. Selections from Egyptian No. 3 crossed by Thew.

Three wheat areas are designated as—(1) Nairobi, including Machakos, Nyeri and Thika, yielding 2 crops in the year; (2) Njoro, including Nakuru, where wheat is at present only grown in the long rains; and (3) the Uasin Gishu Plateau and the Trans-Nzoia, where most of the rain falls in one rainy season. The methods of cultivation vary according to the district. In the Nairobi area only small acreages of wheat are grown, and crops are obtained both during the long rains and during the short rains. In the Njoro district wheat is usually grown in large areas, even up to 1,000 acres. On the Uasin Gishu Plateau usually not more than 200 acres of wheat are planted in any one block, and only one crop of it is sown and reaped each year. The rotation, generally followed in all three districts is either flax, wheat, beans,

or maize, wheat, beans. Wheat must never immediately follow beans, since these add too much nitrogen to the soil.

An interesting and useful table is given of the most important kinds of wheat grown in East Africa, with the districts in which the varieties are grown and remarks on their characters and economic value. A bushel of plateau wheat weighs between 60 and 65 lbs., and the average yield per acre is 20 bushels. A bushel of Njoro wheat weighs between 55 and 60 lbs. and the average yield is 15 bushels to the acre. Calculations are given showing that on 500 acres of wheat a net profit of from £1,250 to £3,250 is to be expected.

Three species of rust fungi attack wheat in East Africa, namely: *Puccinia graminis*, generally known as the "Black Stem Rust," *P. glumarum*, or the "Yellow Rust," and *P. triticina*, or the "Brown" or "Leaf Rust." Of these, *Puccinia graminis* is the worst and the most destructive, and all parts of the plants, but particularly the stems, are attacked. *P. glumarum* is not very common, and is most often found on wheat of Egyptian origin. *P. triticina* appears mostly on the leaves. The most practical method of combating the rust fungi is the breeding and selecting of resistant varieties. Thus by crossing Egyptian wheat, which is very susceptible to the attacks of *P. glumarum*, but highly resistant to *P. graminis*, with the Australian "Nut Cut," which is almost immune to the attacks of *P. glumarum*, but susceptible to *P. graminis*, a variety was obtained, some of whose progeny were highly resistant to both forms of rust. *Ustilago Tritici*, the loose-smut, is very generally distributed in East Africa, and *Cladosporium herbarum* is also responsible for some damage to ripe wheat.

The most serious insect pest of wheat in East Africa is the Wheat Aphis or Green Fly (*Toxoptera graminum*). Natural parasites, introduced from America, have served to keep it in check since 1912. Large animals, such as antelopes, hares, and even elephants, sometimes raid or cross wheat-fields, but the most destructive of all animals to wheat are pigeons and small birds.

W. B. T.

Brazil Wood.—In the paper on this subject (K.B. 1916, pp. 209-225) it was stated that herbarium specimens and a log of "Braziletto" (*Haematocorylon Brasileto*, Karst.), had been promised to the Director from Colombia, with a view to determining the origin of "Peach Wood," "Lima Wood," "Nicaragua Wood" or "Wood of St. Martha," formerly an important article of trade about one hundred years ago. The flowering and fruiting specimens, collected by Mr. M. T. Dawe, F.L.S. (Nos. 480 and 575, Herb. Kew) reached Kew in March, 1917; but the log, although advised in September, 1916, as being ready at Santa Marta for shipment, did not arrive until November, 1919. The delay may best be accounted for in the following letter from the British Vice-Consul, Mr. Philip H. Marshal, at Santa Marta, dated October 10th, 1919: "About two years ago Mr. M. T. Dawe handed over to me for forwarding to you by first opportu-

nity a sample log of the dye-wood known as 'Braziletto,' and the restrictions imposed during the war and the later scarcity of ships between this port and Europe have made it impossible for me to carry out Mr. Dawe's recommendation until now. By s.s. 'Barranca' sailing for Bristol to-morrow I have consigned the log to Messrs. Elders and Fyffes, Ltd., with instructions to forward it to you upon arrival, and by first mail I shall advise Mr. Dawe in Bogota of this unavoidably tardy compliance with his request."

Mr. Boodle has examined the wood in the Jodrell Laboratory, and reports that "this has been compared with specimens in the Kew Museum of "Peach Wood" (Gourlie), "Lima Wood" (two specimens, Gourlie), and "Brazil Wood" (Mexico, Paris Exhibition, 1900).

"Braziletto," "Peach" and "Lima" Wood, as represented by these specimens, may well be the wood of the same species. The "Brazil Wood" (Mexico) is very similar.

The herbarium specimens place beyond all doubt that the species is *Haematoxylon Brasileto*, Karst., and the results of Mr. Boodle's examination of the wood also prove that as suggested in the earlier paper (p. 217) the Museum specimens of "Peach" and "Lima" Woods referred to above are identical.

Although there is no specimen of wood under the name "Nicaragua" or "St. Martha" at Kew, it would seem to be quite safe also to include them under the same species and likewise the Mexican specimen of "Brazil Wood."

Mr. Dawe has also contributed to the Museum photographs showing "A Brazil Wood forest in Colombia," "Carting Brazil Wood to wharf at Santa Marta," and of "Brazil Wood awaiting export at Santa Marta." He reports "that the tree is found on the foot-hills around Santa Marta and appears to be fairly abundant. There is at present (letter to Director, dated Santa Marta, 30th September, 1916), lying here 300 tons for shipment to New York, interest having been aroused locally by the circulation of an exaggerated account of its value in New York. The exporters are now trying to find a market for this consignment in France or elsewhere."

It has been pointed out (l.c. p. 211) that there is now comparatively little or no demand for this wood or for any "Brazil Wood," and further in a recent report (Bull. Imp. Inst. xvi. 1918, p. 6), on a sample of "Braziletto" wood from the Bahamas (*Caesalpinia bahamensis*, Lam.), submitted to a firm of dye-stuff manufacturers, it is stated that "they had compared the Braziletto wood with commercial samples of "Brazil Wood" and "Peach Wood," and that in their opinion it could best be utilised as a substitute for "Peach Wood," although it gives rather browner shades. They added, however, that this wood was not of much interest at the present time."

J. H. H.